

PATENT COOPERATION TREATY

PCT

NOTIFICATION OF THE RECORDING
OF A CHANGE(PCT Rule 92bis.1 and
Administrative Instructions, Section 422)

From the INTERNATIONAL BUREAU

To:

YOSHITAKE, Kenji
Kyowa Patent & Law Office
Room 323, Fuji Bldg.
2-3, Marunouchi 3-chome
Chiyoda-ku, Tokyo 100-0005
JAPON

Date of mailing (day/month/year) 02 November 2001 (02.11.01)	IMPORTANT NOTIFICATION
Applicant's or agent's file reference 130521-709	
International application No. PCT/JP01/01986	International filing date (day/month/year) 13 March 2001 (13.03.01)

1. The following indications appeared on record concerning:

☒ the applicant ☐ the inventor ☐ the agent ☐ the common representative

Name and Address

State of Nationality

JP

State of Residence

JP

Telephone No.

Facsimile No.

Teleprinter No.

2. The International Bureau hereby notifies the applicant that the following change has been recorded concerning:

☒ the person ☐ the name ☐ the address ☐ the nationality ☐ the residence

Name and Address

TORAY INDUSTRIES, INC.
2-1, Nihonbashi Muramachi 2-chome
Chuo-ku
Tokyo 103-8666
Japan

State of Nationality

JP

State of Residence

JP

Telephone No.

Facsimile No.

Teleprinter No.

3. Further observations, if necessary:

The person indicated in Box 2 should be added as an applicant for all designated states except US.

4. A copy of this notification has been sent to:

<input checked="" type="checkbox"/> the receiving Office	<input checked="" type="checkbox"/> the designated Offices concerned
<input type="checkbox"/> the International Searching Authority	<input type="checkbox"/> the elected Offices concerned
<input type="checkbox"/> the International Preliminary Examining Authority	<input type="checkbox"/> other:

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Facsimile No.: (41-22) 740.14.35

Authorized officer

Yukari NAKAMURA

Telephone No.: (41-22) 338.83.38

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
11 October 2001 (11.10.2001)

PCT

(10) International Publication Number
WO 01/76342 A1

(51) International Patent Classification⁷: **H05K 9/00**

(21) International Application Number: **PCT/JP01/02589**

(22) International Filing Date: **28 March 2001 (28.03.2001)**

(25) Filing Language: **English**

(26) Publication Language: **English**

(30) Priority Data:
2000-100876 3 April 2000 (03.04.2000) JP

(71) Applicant (for all designated States except US): **MAT-SUSHITA ELECTRIC INDUSTRIAL CO., LTD.**
[JP/JP]; 1006, Oaza Kadoma, Kadoma-shi, Osaka
571-0050 (JP).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **KUCHIISHI, Koji** [JP/JP]; 729-205, Shinmarukocho, Nakahara-ku, Kawasaki-shi, Kanagawa 211-0005 (JP). **INOMATA, Yoji** [JP/JP]; 3-9-62, Hashidocho, Seya-ku, Yokohama-shi, Kanagawa 246-0037 (JP). **HIGUCHI, Toshihiro** [JP/JP]; 1-102, 1-14, Sugeshiroshita, Tama-ku, Kawasaki-shi,

Kanagawa 214-0007 (JP). **HAGA, Hideo** [JP/JP]; A304, 170-1, Kamihoshikawacho, Hodogaya-ku, Yokohama-shi, Kanagawa 240-0042 (JP). **ISHIHARA, Takashi** [JP/JP]; 749-1-440, Saedocho, Tsuzuki-ku, Yokohama-shi, Kanagawa 224-0054 (JP).

(74) Agents: **OGURI, Shohei** et al.; Eikoh Patent Office, ARK Mori Building, 28th Floor, 12-32, Akasaka 1-chome, Minato-ku, Tokyo 107-6028 (JP).

(81) Designated States (national): **CN, US.**

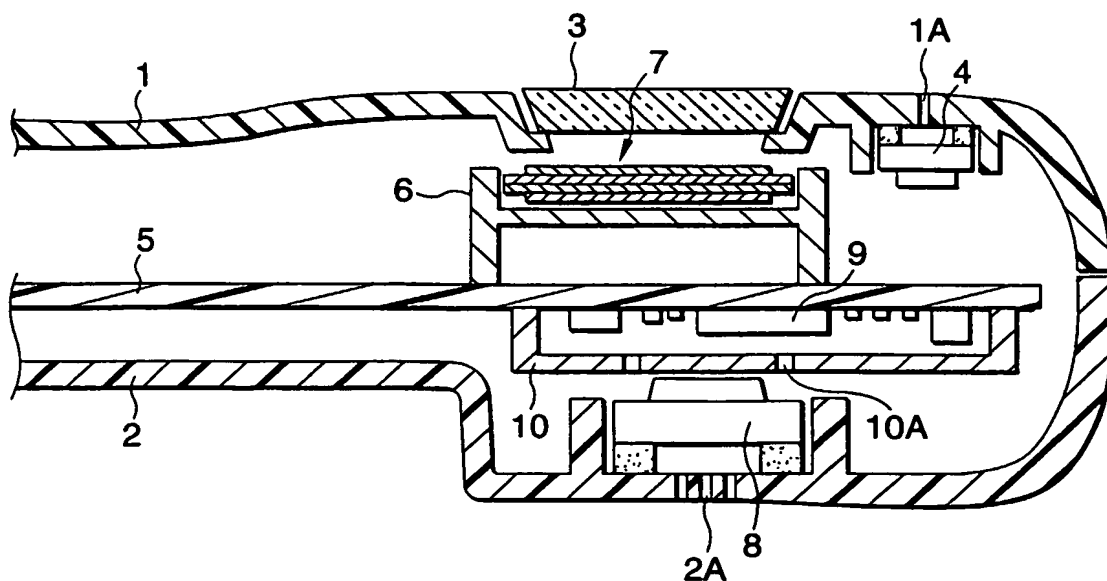
(84) Designated States (regional): European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR).

Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **PORTABLE RADIO APPARATUS**



(57) Abstract: A portable radio apparatus has a radio circuit (9) provided on a printed circuit board (5), a speaker (8) provided on a rear cover (2), and a shield case (10) provided to cover the radio circuit (9). In the shield case (10), ventilation holes (10A) having a size that does not affect the shielding performance are provided in close proximity of the rear of the speaker (8).

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WO 01/76342 A1

DESCRIPTION

PORTABLE RADIO APPARATUS

5 Technical Field

The present invention relates to portable radio apparatus such as a portable telephone set, and in particular to a portable radio apparatus with improved sound quality of a speaker.

10 Background Art

In portable radio apparatus such as a portable telephone set, the casing is getting more and more compact and low-profile in order to enhance portability. Thus, efforts have been made to install in high density a radio circuit, a speaker, a receiver,
15 and an LCD (Liquid Crystal Display) module in a limited space within the casing.

In general, a speaker is easier to vibrate when the volume of a space present at the rear of the speaker is larger. In the portable telephone set, it is difficult to reserve a
20 sufficient space at the rear of the speaker because of the high-density install; as a result, full performance of a speaker cannot be obtained.

It is requested to prevent an electromagnetic wave from generating a noise in the speaker.

25 The inventions has been proposed to solve such problems

and aims at providing a portable radio apparatus that prevents propagation of an electromagnetic wave from a radio circuit to a speaker and improves sound quality of a speaker.

5 Disclosure of Invention

Portable radio apparatus according to the invention is portable radio apparatus comprising a radio circuit, a speaker, and a shield member for electromagnetically shielding the radio circuit from the speaker, characterized in that the shield member
10 is provided with ventilation holes having a size that does not affect the shielding performance. Via this configuration, it is possible to let air compressed by the vibration at the rear of the speaker to pass through ventilation holes without reducing the shielding performance inherent to the shield member. Thus
15 it is possible to prevent propagation of an electromagnetic wave from a radio circuit to a speaker and improve the sound quality of the speaker.

Brief Description of the Drawings

20 Fig. 1 is an internal structure of portable radio apparatus according to a first embodiment of the invention; and

Fig. 2 is an internal structure of portable radio apparatus according to a second embodiment of the invention.

25 Best Mode for Carrying Out the Invention

Embodiments of the invention will be detailed with reference to the drawings. In the following description, the section of a portable radio apparatus positioned upward when the portable radio apparatus is used is assumed as the upper
5 section of the portable radio apparatus.

(First embodiment)

Fig. 1 is a cross-sectional view of the internal structure of the section above the approximate center of portable radio apparatus according to a first embodiment of the invention.

10 The portable radio apparatus comprises a front cover 1 and a rear cover 2 as a casing. On top of the front cover 1 is provided an opening, where a transparent panel 3 for liquid display is fixed. In close proximity of the upper end of the front cover 1, a receiver sound hole 1A is provided. At the
15 position on the inner surface of the front cover 1 corresponding to the receiver sound hole 1A, a receiver 4 is fixed via a cushion. On top of the rear cover 2, a plurality of speaker sound holes 2A are provided. At the position on the inner surface of the rear cover 2 corresponding to the speaker sound holes 2A, a
20 speaker 8 is fixed.

Within the casing composed of the front cover 1 and the rear cover 2, a printed circuit board 5 is provided. On the upper face of the printed circuit board 5, an LCD holder 6, which holds an LCD module 7 is provided. On the lower face
25 of the printed circuit board 5, a radio circuit 9 is mounted.

Further, a shield case having a shape to cover the radio circuit 9 is provided. In close proximity of the position at the bottom of the shield case 10 that is opposite to the rear of the speaker 8, a plurality of ventilation holes 10A are provided. The size of a ventilation hole 10A is specified so as not to affect the performance of shielding an electromagnetic wave radiated from the radio circuit 9. The size is specified depending on the use frequency of a portable telephone set.

In portable radio apparatus having the above configuration, vibration of the speaker 8 is propagated via a rear sound hole (not shown). Air compressed by the vibration of the speaker 8 is propagated around from the rear of the speaker 8. Part of the compressed air passes through the ventilation holes 10A on the shield case 10 and reaches the space within the shield case 10. Providing ventilation holes 10A in the shield case 10 allows the space in the shield case 10 to be used for upgrading the sound quality of the speaker 8.

An electromagnetic wave radiated from the radio circuit 9 is shielded by the shield case 10 and never leaks out of the shield case 10. Thus, a noise, caused by that the electromagnetic wave radiated from the radio circuit 9 reaches the speaker 8, is not generated.

In this way, in portable radio apparatus according to the first embodiment of the invention, a shield case 10 is disposed to cover the radio circuit 9 and ventilation holes

10A having a size that does not affect the shielding performance are provided on the face that is opposite to the rear of the speaker 8. This improves the sound quality of the speaker 8 and prevents propagation of an electromagnetic wave from the radio circuit to the speaker 8.

(Second embodiment)

Fig. 2 is a cross-sectional view of the internal structure of the section above the approximate center of portable radio apparatus according to a second embodiment of the invention. The same components as those in Fig. 1 are given the same signs and the corresponding description is omitted.

In this embodiment, a holder 11 having a shield feature is provided instead of a shield case 10 in the first embodiment. The holder 11 has a surface composed of for example a metallized resin to shield the speaker 8 from an electromagnetic wave radiated from the radio circuit 9. The holder 11 has a shape that to cover the rear and sides of the speaker 8. In close proximity of the rear of the speaker 8, ventilation holes 11A having a size that does not affect the performance of shielding an electromagnetic wave radiated from the radio circuit 9 are provided. Metallizing a section on the inner surface of the rear cover 2 that faces the radio circuit 9 prevents the electromagnetic wave radiated from the radio circuit 9 from leaking out of the rear cover 2. Configuration of the other sections is the same as the first embodiment.

In portable radio apparatus having the above configuration, vibration of the speaker 8 is propagated via a rear sound hole (not shown). Air compressed by the vibration of the speaker 8 is propagated around from the rear of the speaker 8. The compressed air passes through the ventilation holes 11A in the holder 11 and is propagated in the surrounding space. Thus, the space around the holder 11 can be used to improve the sound quality of the speaker 8.

Since the speaker 8 is shielded by the holder 11, the electromagnetic wave radiated from the radio circuit 9 never reaches the speaker 8 nor generates a noise. The electromagnetic wave radiated from the radio circuit 9 and propagated to the inner surface of the rear cover 2 is reflected on the metallized inner surface and never leaks out of the rear cover 2.

In this way, portable radio apparatus according to the second embodiment of the invention is provided with a holder 11 that has a shape to cover the rear and sides of the speaker 8 and ventilation holes 11A that do not affect the performance of shielding an electromagnetic wave radiated from the radio circuit 9 in close proximity of the rear of the speaker 8. This improves the sound quality of the speaker 8 and prevents propagation of an electromagnetic wave from the radio circuit to the speaker 8.

Industrial Applicability

As mentioned earlier, the portable radio apparatus according to the invention has excellent advantages that propagation of an electromagnetic wave from a radio circuit to a speaker is prevented and the sound quality of the speaker is improved, by providing ventilation holes in a shield member for electromagnetically shielding the radio circuit from the speaker, said ventilation holes having a size that does not affect the shielding performance.

CLAIMS

1. A portable radio apparatus comprising:

a radio circuit;

5 a speaker; and

a shield member for electromagnetically shielding the
radio circuit from the speaker,

wherein the shield member includes a ventilation hole
having a size that does not affect the shielding performance.

10

2. A portable radio apparatus according to claim 1,

wherein the shield member is a shield case disposed to cover
the radio circuit.

15

3. A portable radio apparatus according to claim 1,

wherein the shield member is a holder having a shape to cover
the rear and sides of the speaker.

4. A portable radio apparatus according to claim 1,

20 wherein the ventilation hole is provided in close proximity
of the sound hole at the rear of the speaker.

FIG. 1

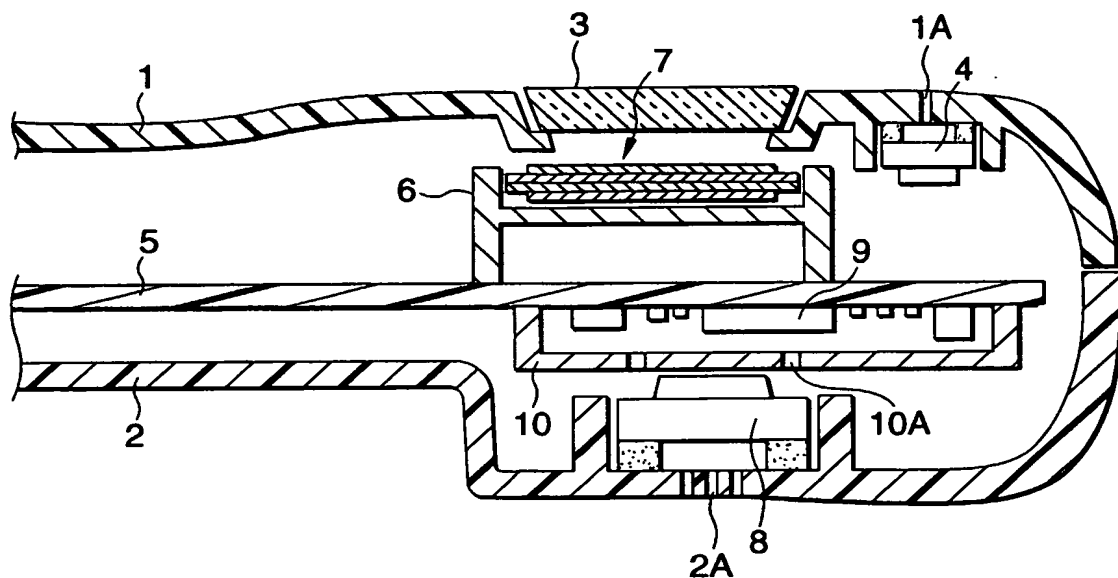
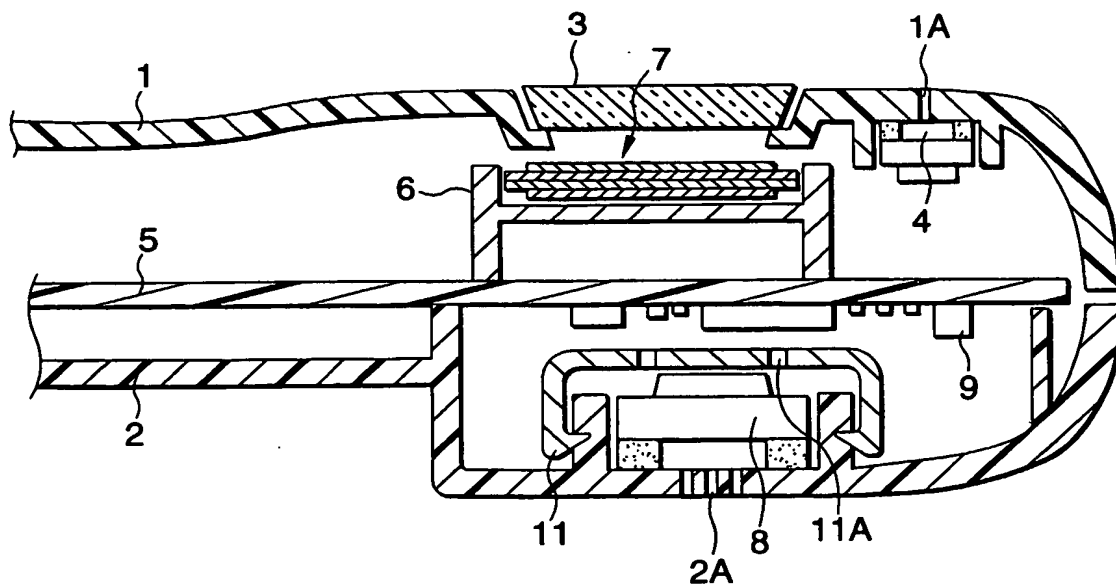


FIG. 2



INTERNATIONAL SEARCH REPORT

International Application No.
PCT/JP 01/02589

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H05K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H05K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 717 989 A (BUSS THOMAS E ET AL) 5 January 1988 (1988-01-05) column 3, line 6 - line 39; figures ---	1-4
A	EP 0 963 148 A (INSTR SPECIALTIES CO INC) 8 December 1999 (1999-12-08) paragraph '0015!; figure 1 ---	1-4
A	US 5 406 038 A (REIFF DAVID E ET AL) 11 April 1995 (1995-04-11) column 3, line 39 -column 4, line 5; figure 2 -----	1-4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *&* document member of the same patent family

Date of the actual completion of the international search

29 August 2001

Date of mailing of the international search report

04/09/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Rubenowitz, A

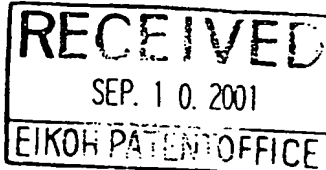
INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 01/02589

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4717989 A	05-01-1988	NONE	
EP 0963148 A	08-12-1999	US 6136131 A JP 11354967 A SG 74731 A	24-10-2000 24-12-1999 22-08-2000
US 5406038 A	11-04-1995	NONE	



From the INTERNATIONAL SEARCHING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT
OR THE DECLARATION

(PCT Rule 44.1)

To:

EIKOH PATENT OFFICE
Attn. Oguri, Shohei
28th Floor, ARK Mori Building
12-32, Akasaka 1-Chome, Minato-Ku
TOKYO 107-6028
JAPAN

Date of mailing
(day/month/year)

04/09/2001

Applicant's or agent's file reference
P-37324

FOR FURTHER ACTION See paragraphs 1 and 4 below

International application No.
PCT/JP 01/02589

International filing date
(day/month/year)

28/03/2001

Applicant

MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. et al.

1. ☒ The applicant is hereby notified that the International Search Report has been established and is transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 46):

When? The time limit for filing such amendments is normally 2 months from the date of transmittal of the International Search Report; however, for more details, see the notes on the accompanying sheet.

Where? Directly to the International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland
Facsimile No.: (41-22) 740.14.35

For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no International Search Report will be established and that the declaration under Article 17(2)(a) to that effect is transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.


4. **Further action(s):** The applicant is reminded of the following:

Shortly after 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

Within 19 months from the priority date, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later).

Within 20 months from the priority date, the applicant must perform the prescribed acts for entry into the national phase before all designated Offices which have not been elected in the demand or in a later election within 19 months from the priority date or could not be elected because they are not bound by Chapter II.

Name and mailing address of the International Searching Authority

 European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Federico Bonomelli

These Notes are intended to give the basic instructions concerning the filing of amendments under article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the PCT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
"Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

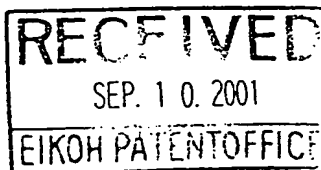
Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see Volume II of the PCT Applicant's Guide.



INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference P-37324	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/JP 01/02589	International filing date (day/month/year) 28/03/2001	(Earliest) Priority Date (day/month/year) 03/04/2000
Applicant MATSUSHITA ELECTRIC INDUSTRIAL CO., LTD. et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 2 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international search was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ Certain claims were found unsearchable (See Box I).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the drawings to be published with the abstract is Figure No.

☒ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

1

☐ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

/JP 01/02589

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H05K9/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H05K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 717 989 A (BUSS THOMAS E ET AL) 5 January 1988 (1988-01-05) column 3, line 6 - line 39; figures ---	1-4
A	EP 0 963 148 A (INSTR SPECIALTIES CO INC) 8 December 1999 (1999-12-08) paragraph '0015!; figure 1 ---	1-4
A	US 5 406 038 A (REIFF DAVID E ET AL) 11 April 1995 (1995-04-11) column 3, line 39 -column 4, line 5; figure 2 -----	1-4

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *O* document referring to an oral disclosure, use, exhibition or other means
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